

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

Claims 1-20 (canceled)

21. (New) An apparatus for encoding information represented by at least first and second data items, said apparatus comprising:

a memory that stores data associated with a reference signal complex, the reference signal complex including at least first and second spectral components having first and second frequencies, respectively, the first and second frequencies being different, the first and second spectral components having first and second reference parameters, respectively;

an input that receives the first and second data items;

a processor executing a set of programmed instructions for adjusting the first reference parameter of the first spectral component of the reference signal complex in accordance with the first data item and for adjusting the second reference parameter of the second spectral component of the reference signal complex in accordance with the second data item,

the processor further forming an encoded signal complex including at least the adjusted first and second spectral components; and

an output that is adapted to communicate the encoded signal complex to another apparatus external to the encoding apparatus.

22. (New) An apparatus according to claim 21, wherein the first and second reference parameters comprise amplitude.

23. (New) An apparatus according to claim 21, wherein the first and second reference parameters comprise phase.

24. (New) An apparatus according to claim 21, wherein the apparatus is a modem and the another apparatus is a port coupled to a data communications network.

25. (New) An apparatus according to claim 21, wherein the apparatus is a storage interface and the another apparatus is a storage device.

26. (New) An apparatus according to claim 21, wherein the apparatus further includes:

a second memory that stores data associated with the reference signal complex;
 a second input that receives the encoded signal complex; and
 a second processor executing a set of programmed instructions for extracting the first adjusted spectral component from the encoded reference signal complex based on the reference signal complex and for extracting the second adjusted spectral component from the encoded signal complex based on the reference signal complex,
 the processor further obtaining the first and second data items using the first and second adjusted spectral components.

27. (New) An apparatus according to claim 26, wherein the apparatus is a modem and the another apparatus is a port coupled to a data communications network, the modem allowing communication of encoded information using a standard communications protocol at greater throughput rates than when the information is not encoded by the apparatus and is communicated using the standard communications protocol.

28. (New) An apparatus according to claim 26, wherein the apparatus is a storage interface and the another apparatus is a storage device, the storage interface allowing a greater amount of information to be stored on and retrieved from a defined amount of space in the storage device when the information is encoded by the apparatus than when the information is not encoded by the apparatus.

29. (New) A method for encoding information represented by at least first and second data items, the method comprising:

 storing data associated with a reference signal complex, the reference signal complex including at least first and second spectral components having first and second frequencies, respectively, the first and second frequencies being different, the first and second spectral components having first and second reference parameters, respectively;

 receiving the first and second data items;

 adjusting the first reference parameter of the first spectral component of the reference signal complex in accordance with the first data item;

 adjusting the second reference parameter of the second spectral component of the reference signal complex in accordance with the second data item;

 forming an encoded signal complex including at least the adjusted first and second spectral components; and

 communicating the encoded signal complex to an external apparatus.

30. (New) A method according to claim 29, wherein the first and second reference parameters comprise amplitude.

31. (New) A method according to claim 29, wherein the first and second reference parameters comprise phase.

32. (New) A method according to claim 29, wherein the method is implemented in a modem and the external apparatus is a port coupled to a data communications network.

33. (New) A method according to claim 29, wherein the method is implemented in a storage interface and the external apparatus is a storage device.

34. (New) A method according to claim 29, wherein the method further includes:
receiving the encoded signal complex; and
extracting the first adjusted spectral component from the encoded reference signal complex based on the reference signal complex;
extracting the second adjusted spectral component from the encoded signal complex based on the reference signal complex; and
obtaining the first and second data items using the first and second adjusted spectral components.

35. (New) A method according to claim 27, wherein the adjusting steps are performed using a processor executing a set of programmed instructions.

36. (New) A method according to claim 34, wherein the extracting steps are performed using a processor executing a set of programmed instructions.

37. (New) A method according to claim 35, wherein the programmed instructions include an inverse FFT.

38. (New) A method according to claim 36, wherein the programmed instructions include an FFT.